



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,979	12/06/2001	Satoshi Maruyama	216935US0	4984
22850	7590	04/06/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			CANTELMO, GREGG	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 04/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/002,979

Applicant(s)

MARUYAMA ET AL.

Examiner

Gregg Cantelmo

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1. In response to the amendment received February 2, 2004:
  - a. The specification objections have been overcome by the amendment;
  - b. The claim objection stands as applied to the amended claims;
  - c. The prior art 102 rejection stands;
  - d. The prior art 103 rejections stand.

### ***Claim Objections***

2. Claims 5 and 6 are objected to because of the following informalities: in light of the amendment to claim 3 which deleted the term "or" in line 1, the amendment to claim 5, lines 1-2 now read as "to claim 3 4,". Appropriate correction is required.
3. Claim 9 is objected to because of the following informalities: new claim 9 is dependent upon latter claim 10. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 recites that the homopolymer, lactone and salt are contained as solid electrolyte components. However claim 1 recites that these materials are electrode components. If the materials are in the electrode as recited in claim 1, it is not understood how the same materials are later used as the solid electrolyte components.

It may be that both the electrode and electrolyte can comprise the same materials however the manner in which claim 9 attempts to recite this is unclear. In addition claim 10 recites that the electrolyte has a solvent (thus not a solid electrolyte), but dependent claim 9 recites the electrolyte components are solid. It is unclear whether the electrolyte is solid or liquid.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent No. 5,720,780 (Liu).

Liu discloses an electrode composition comprising a PVDF homopolymer (abstract). The electrolyte can be LiBF<sub>4</sub> (col. 8, ll. 24-27) and the solvent for the electrolyte can be a lactone,  $\gamma$ -butyrolactone in particular (paragraph bridging columns 7 and 8 as applied to claim 1).

With respect to the process of obtaining the PVDF homopolymer:

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

"The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

The device is used in a lithium secondary battery (as applied to claim 3).

The PVDF, electrolyte salt and electrolyte solvent are all contained as solid electrolyte components (claim 4).

Art Unit: 1745

***Response to Arguments***

8. Applicant's arguments filed February 2, 2004 have been fully considered but they are not persuasive.

Evidence of secondary considerations, such as unexpected results or commercial success, is irrelevant to 35 U.S.C. 102 rejections and thus cannot overcome a rejection so based (See MPEP § 2131.04).

In addition the arguments to unexpected results are not in the form of an Affidavit or Declaration and thus not in proper form for full consideration of unexpected results. The arguments of counsel cannot take the place of evidence in the record. In re Schulze, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965). Examples of attorney statements which are not evidence and which must be supported by an appropriate affidavit or declaration include statements regarding unexpected results, commercial success, solution of a long-felt need, inoperability of the prior art, invention before the date of the reference, and allegations that the author(s) of the prior art derived the disclosed subject matter from the applicant. See MPEP § 2145.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1745

10. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent No. 5,922,493 (Humphrey) in view of JP 2000-235868-A (JP '868).

Humphrey discloses an electrode composition comprising a PVDF homopolymer (abstract and col. 5, ll. 9-43). The PVDF is preferably formed by emulsion polymerization to provide for a high-purity polymer.

Humphrey uses KYNAR 741 homopolymer (see Table IV). Kynar 741 has an inherent crystallinity between 50 and 60%, thus greater than 30% and an inherent molecular weight of  $323 \times 1000$  g/mol, thus greater than 50,000 (as applied to claim 2). Applicant is invited to review the manufacture's web page, in particular, <http://www.atofinachemicals.com/literature/pdf/19.pdf>. The literature therein discloses the crystallinity and molecular weight of Kynar.

The device is used in a lithium secondary battery (as applied to claim 3).

The PVDF is a solid component (claim 4).

The differences between instant claims and Humphrey are does not disclose of the salt being a lithium fluoroborate salt in a lactone solvent (claim 1), of the electrolyte further containing a cyclic carbonate in the volume ratio of 3/7-1/9 ethylene carbonate to  $\gamma$ -butyrolactone (claim 2), of the borate salt and lactone also being a solid component (claim 4).

JP '868 discloses that it is advantageous to provide a  $\text{LiBF}_4$  electrolyte in a nonaqueous solvent containing over 50-95% vol.  $\gamma$ -butyrolactone (abstract and paragraphs [0049]-[0051] and [0153] as applied to claims 1 and 2).

Art Unit: 1745

The motivation for using the electrolyte composition of JP '868 is that it provides a battery having improved charge-and-discharge cycling, a high current discharge property.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Humphrey by providing a LiBF<sub>4</sub> electrolyte in a nonaqueous solvent containing over 50-95% vol.  $\gamma$ -butyrolactone since it would have provided a battery having improved charge-and-discharge cycling, a high current discharge property.

### ***Response to Arguments***

11. Applicant's arguments filed February 2, 2004 have been fully considered but they are not persuasive.

Applicant's arguments fail to show a side-by-side comparison between the prior art rejection of record and the instant claims as to unexpected results. Further Applicant's response states that the results are unexpected but the response fails to provide a clear explanation as to the nature of the unexpected results.

The comparisons shown in Applicant's arguments are not representative of a side-by-side comparison and thus are not convincing evidence.

In addition the arguments to unexpected results are not in the form of an Affidavit or Declaration and thus not in proper form for full consideration of unexpected results. The arguments of counsel cannot take the place of evidence in the record. In re Schulze, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965). Examples of attorney



Art Unit: 1745

statements which are not evidence and which must be supported by an appropriate affidavit or declaration include statements regarding unexpected results, commercial success, solution of a long-felt need, inoperability of the prior art, invention before the date of the reference, and allegations that the author(s) of the prior art derived the disclosed subject matter from the applicant. See MPEP § 2145.

Lastly, the prior art of Humphrey recognized the same benefits of providing the PVDF formed by emulsion polymerization since it provides for a high-purity polymer.

### ***Claim Rejections - 35 USC § 103***

12. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Humphrey in view of JP '868 as applied to claims 1-4 above, and further in view of U.S. patent No. 4,668,595 (Yoshino).

The differences not yet discussed are of the particulars of the cathode active substance (claims 5 and 6) and of the amount of  $\gamma$ -butyrolactone in the electrolyte (claim 5).

With respect to the amount of  $\gamma$ -butyrolactone in the electrolyte:

As discussed above, JP '868 teaches of using amount of  $\gamma$ -butyrolactone in the electrolyte in the range set forth in claim 5.

The motivation for using the electrolyte composition of JP '868 is that it provides a battery having improved charge-and-discharge cycling, a high current discharge property.

Art Unit: 1745

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Humphrey by providing a LiBF<sub>4</sub> electrolyte in a nonaqueous solvent containing over 50-95% vol.  $\gamma$ -butyrolactone since it would have provided a battery having improved charge-and-discharge cycling, a high current discharge property.

With respect to the particulars of the cathode:

Yoshino discloses of a lithiated cobalt oxide cathode wherein Sn is added to the cathode active material in an amount from 0.001-0.1 relative to 0.85-1.0 of cobalt (col. 4, ll. 10-52 and col. 11, ll. 46-52).

The motivation for providing an additive material of Sn to a lithiated cobalt oxide within the range of Yoshino is that it improves the cycling particularly in deep charging and discharging cycles (col. 4, ll. 35-52).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Humphrey by providing an additive material of Sn to a lithiated cobalt oxide within the range of Yoshino since it would have improved the cycling particularly in deep charging and discharging cycles.

### ***Response to Arguments***

13. Applicant's makes no further arguments to the rejection of claims 5-6 apart from those arguments drawn to the rejection of claim 1-4, discussed above and incorporated herein.

***Claim Rejections - 35 USC § 103***

14. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent No. 5,720,780 (Liu) in view of Humphrey and JP '868.

In the event that Applicant shows criticality of the process of obtaining the homopolymer:

Liu discloses an electrode composition comprising a PVDF homopolymer (abstract). The electrolyte can be LiBF<sub>4</sub> (col. 8, ll. 24-27) and the solvent for the electrolyte can be a lactone,  $\gamma$ -butyrolactone in particular (paragraph bridging columns 7 and 8).

Liu uses KYNAR 741 homopolymer (see Example 2 and Tables I and II). Kynar 741 has an inherent crystallinity between 50 and 60%, thus greater than 30% and an inherent molecular weight of 323 x 1000 g/mol, thus greater than 50,000 (as applied to claim 2). Applicant is invited to review the manufacture's web page, in particular, <http://www.atofinachemicals.com/literature/pdf/19.pdf>. The literature therein discloses the crystallinity and molecular weight of Kynar.

The device is used in a lithium secondary battery (as applied to claim 3).

The PVDF, electrolyte salt and electrolyte solvent are all contained as solid electrolyte components (claim 4).

The differences between instant claim 1 and Liu are that Liu does not disclose of the PVDF obtained from emulsion polymerization (claim 1), the salt being a lithium fluoroborate salt in a lactone solvent (claim 1), of the electrolyte further containing a

Art Unit: 1745

cyclic carbonate in the volume ratio of 3/7-1/9 ethylene carbonate to  $\gamma$ -butyrolactone (claim 2).

With respect to a PVDF polymer obtained from emulsion polymerization:

Humphrey discloses an electrode composition comprising a PVDF homopolymer (abstract and col. 5, ll. 9-43). The PVDF is preferably formed by emulsion polymerization to provide for a high-purity polymer.

The motivation for employing a PVDF homopolymer obtained by emulsion polymerization is it that it would have provided a higher purity polymer.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Liu by employing a PVDF homopolymer obtained by emulsion polymerization since it would have provide a higher purity polymer.

With respect to the electrolyte being lithium fluoroborate and the solvent being a lactone and further of the electrolyte further containing a cyclic carbonate in the volume ratio of 3/7-1/9 ethylene carbonate to  $\gamma$ -butyrolactone:

Liu discloses that a number of electrolyte materials and solvents can be used in the battery of Liu. For example the electrolyte can be  $\text{LiBF}_4$  (col. 8, ll. 24-27) and the solvent for the electrolyte can be a lactone,  $\gamma$ -butyrolactone in particular (paragraph bridging columns 7 and 8).

JP '868 discloses that it is advantageous to provide a LiBF<sub>4</sub> electrolyte in a nonaqueous solvent containing over 50-95% vol.  $\gamma$ -butyrolactone (abstract and paragraphs [0049]-[0051] and [0153] as applied to claims 1 and 2).

The motivation for using the electrolyte composition of JP '868 is that it provides a battery having improved charge-and-discharge cycling, a high current discharge property.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Liu by providing a LiBF<sub>4</sub> electrolyte in a nonaqueous solvent containing over 50-95% vol.  $\gamma$ -butyrolactone since it would have provided a battery having improved charge-and-discharge cycling, a high current discharge property.

### ***Response to Arguments***

15. Applicant's arguments filed February 2, 2004 have been fully considered but they are not persuasive.

Applicant's arguments fail to show a side-by-side comparison between the prior art rejection of record and the instant claims as to unexpected results. Further Applicant's response states that the results are unexpected but the response fails to provide a clear explanation as to the nature of the unexpected results.

The comparisons shown in Applicant's arguments are not representative of a side-by-side comparison and thus are not convincing evidence.

Art Unit: 1745

In addition the arguments to unexpected results are not in the form of an Affidavit or Declaration and thus not in proper form for full consideration of unexpected results. The arguments of counsel cannot take the place of evidence in the record. In re Schulze, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965). Examples of attorney statements which are not evidence and which must be supported by an appropriate affidavit or declaration include statements regarding unexpected results, commercial success, solution of a long-felt need, inoperability of the prior art, invention before the date of the reference, and allegations that the author(s) of the prior art derived the disclosed subject matter from the applicant. See MPEP § 2145.

Lastly, the prior art of Humphrey recognized the same benefits of providing the PVDF formed by emulsion polymerization since it provides for a high-purity polymer.

### ***Claim Rejections - 35 USC § 103***

16. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu in view of Humphrey and JP '868 as applied to claims 1-4 above, and further in view of U.S. patent No. 4,668,595 (Yoshino).

The differences not yet discussed are of the particulars of the cathode active substance (claims 5 and 6) and of the amount of  $\gamma$ -butyrolactone in the electrolyte (claim 5).

With respect to the amount of  $\gamma$ -butyrolactone in the electrolyte:

As discussed above, JP '868 teaches of using amount of  $\gamma$ -butyrolactone in the electrolyte in the range set forth in claim 5.

The motivation for using the electrolyte composition of JP '868 is that it provides a battery having improved charge-and-discharge cycling, a high current discharge property.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Liu by providing a LiBF<sub>4</sub> electrolyte in a nonaqueous solvent containing over 50-95% vol.  $\gamma$ -butyrolactone since it would have provided a battery having improved charge-and-discharge cycling, a high current discharge property.

With respect to the particulars of the cathode:

Yoshino discloses of a lithiated cobalt oxide cathode wherein Sn is added to the cathode active material in an amount from 0.001-0.1 relative to 0.85-1.0 of cobalt (col. 4, ll. 10-52 and col. 11, ll. 46-52).

The motivation for providing an additive material of Sn to a lithiated cobalt oxide within the range of Yoshino is that it improves the cycling particularly in deep charging and discharging cycles (col. 4, ll. 35-52).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Liu by providing an additive material of Sn to a lithiated cobalt oxide within the range of Yoshino since it would have improved the cycling particularly in deep charging and discharging cycles.

***Response to Arguments***

17. Applicant's makes no further arguments to the rejection of claims 5-6 apart from those arguments drawn to the rejection of claim 1-4, discussed above and incorporated herein.

***Claim Rejections - 35 USC § 103***

18. Claims 7, 8, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshino in view of U.S. patent No. 6,106,973 (Sonozaki) and JP '868.

Yoshino discloses a lithium secondary battery comprising a cathode, anode and electrolyte encased in a housing (abstract and figures), wherein the cathode is a lithium cobalt oxide material. Yoshino discloses of a lithiated cobalt oxide cathode wherein Sn is added to the cathode active material in an amount from 0.001-0.1 relative to 0.85-1.0 of cobalt (col. 4, ll. 10-52 and col. 11, ll. 46-52).

Yoshino discloses of a lithiated cobalt oxide cathode (col. 11, ll. 46-52) wherein Sn is added to the cathode active material in an amount from 0.001-0.1 relative to 0.85-1.0 of cobalt (abstract and prior art claim 1). The electrolyte can comprise a lactone solvent (col. 12, ll. 5-29 as applied to claim 7).

The element M is Sn (paragraph [0085] as applied to claim 8).

The differences between instant claims and Yoshino are that Yoshino does not disclose of the housing having a thickness of 0.3 mm or less (claim 7), and further of



Art Unit: 1745

0.15 mm or less (claims 14 and 15), of the electrolyte solvent having 60-95% vol.  $\gamma$ -butyrolactone (claim 7).

With respect to the thickness of the housing (claims 7, 14 and 15):

Sonozaki discloses that it is known in the art to employ flat cell housings wherein the laminate has a combined thickness of 150 microns or less (col. 4, ll. 55-64 and col. 6, ll. 1-12).

The motivation for using the housing thickness of Sonozaki is that it provides a casing for the battery which has an efficient seal while also reducing the size of the battery and increasing the electric discharge capacity of the cell (col. 2, ll. 14-55).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Yoshino by modifying the thickness of the housing to be 150 microns or less as taught by Sonozaki since it would have provided a casing for the battery which has an efficient seal, reduced the size of the battery and increased the electric discharge capacity of the cell.

With respect to the electrolyte solvent having 60-95% vol.  $\gamma$ -butyrolactone (claim 7):

Yoshino discloses that the electrolyte can be  $\text{LiBF}_4$  and the solvent a lactone (see paragraphs [0058]-[0059]).

JP '868 discloses that it is advantageous to provide a  $\text{LiBF}_4$  electrolyte in a nonaqueous solvent containing over 50-95% vol.  $\gamma$ -butyrolactone (abstract and paragraphs [0049]-[0051]).

The motivation for using the electrolyte composition of JP '868 is that it provides a battery having improved charge-and-discharge cycling, a high current discharge property.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Yoshino by providing a LiBF<sub>4</sub> electrolyte in a nonaqueous solvent containing over 50-95% vol.  $\gamma$ -butyrolactone since it would have provided a battery having improved charge-and-discharge cycling, a high current discharge property.

### ***Response to Arguments***

19. Applicant's arguments filed February 2, 2004 have been fully considered but they are not persuasive.

Applicant's arguments fail to show a side-by-side comparison between the prior art rejection of record and the instant claims as to unexpected results. Further Applicant's response states that the results are unexpected but the response fails to provide a clear explanation as to the nature of the unexpected results.

The comparisons shown in Applicant's arguments are not representative of a side-by-side comparison and thus are not convincing evidence.

In addition the arguments to unexpected results are not in the form of an Affidavit or Declaration and thus not in proper form for full consideration of unexpected results. The arguments of counsel cannot take the place of evidence in the record. In re Schulze, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965). Examples of attorney

Art Unit: 1745

statements which are not evidence and which must be supported by an appropriate affidavit or declaration include statements regarding unexpected results, commercial success, solution of a long-felt need, inoperability of the prior art, invention before the date of the reference, and allegations that the author(s) of the prior art derived the disclosed subject matter from the applicant. See MPEP § 2145.

### ***Claim Rejections - 35 USC § 103***

20. Claims 9-13 rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshino in view of Humphrey and JP '868.

Yoshino discloses a lithium secondary battery comprising a cathode, anode and electrolyte encased in a housing (abstract and figures), wherein the cathode is a lithium cobalt oxide material. Yoshino discloses of a lithiated cobalt oxide cathode wherein Sn is added to the cathode active material in an amount from 0.001-0.1 relative to 0.85-1.0 of cobalt (col. 4, ll. 10-52 and col. 11, ll. 46-52).

Yoshino discloses of a lithiated cobalt oxide cathode (col. 11, ll. 46-52) wherein Sn is added to the cathode active material in an amount from 0.001-0.1 relative to 0.85-1.0 of cobalt (abstract and prior art claim 1). The electrolyte can comprise a lactone solvent (col. 12, ll. 5-29 as applied to claims 10 and 11).

The element M is Sn (paragraph [0085] as applied to claims 12 and 13).

The differences between instant claims and Yoshino are that Yoshino does not disclose of the electrode composition as defined in claim 2 (to claim 10) or claim 4 (to claim 11) or of the electrolyte solvent having 60-95% vol.  $\gamma$ -butyrolactone (claims 10 and

Art Unit: 1745

11), or of an electrolyte having the homopolymer, lactone and salt of the same material as the electrode (claim 9).

With respect to the electrode composition of claims 2 and 4, required in claims 10 and 11, respectively:

Humphrey discloses an electrode composition comprising a PVDF homopolymer (abstract and col. 5, ll. 9-43). The PVDF is preferably formed by emulsion polymerization to provide for a high-purity polymer.

Humphrey uses KYNAR 741 homopolymer (see Table IV). Kynar 741 has an inherent crystallinity between 50 and 60%, thus greater than 30% and an inherent molecular weight of  $323 \times 1000$  g/mol, thus greater than 50,000). Applicant is invited to review the manufacture's web page, in particular, <http://www.atofinchemicals.com/literature/pdf/19.pdf>. The literature therein discloses the crystallinity and molecular weight of Kynar.

The PVDF is a solid component (claim 4).

The motivation for using the electrode composition of Humphrey is that it provides a high purity electrode wherein the active material utilization has improved efficiency along with improved strength of the electrode (col. 4, ll. 4-14).

With respect to the electrolyte solvent having 60-95% vol.  $\gamma$ -butyrolactone (claims 10 and 11):

Yoshino discloses that the electrolyte can be LiBF<sub>4</sub> and the solvent a lactone (see paragraphs [0058]-[0059]).

JP '868 discloses that it is advantageous to provide a LiBF<sub>4</sub> electrolyte in a nonaqueous solvent containing over 50-95% vol.  $\gamma$ -butyrolactone (abstract and paragraphs [0049]-[0051]).

The motivation for using the electrolyte composition of JP '868 is that it provides a battery having improved charge-and-discharge cycling, a high current discharge property.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Yoshino by providing a LiBF<sub>4</sub> electrolyte in a nonaqueous solvent containing over 50-95% vol.  $\gamma$ -butyrolactone since it would have provided a battery having improved charge-and-discharge cycling, a high current discharge property.

With respect to claim 9:

Humphrey teaches that both the electrode and electrolyte can be formed by the same homopolymer, lactone and salt (abstract).

The motivation for providing the electrode and electrolyte as the same material is that it improves the utilization of the active material at the electrode electrolyte interface and provides an easier manufacturing process for the components of the battery (col. 6, ll. 33-43).

Art Unit: 1745

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Yoshino by providing the electrode and electrolyte as the same material since it would have improved the utilization of the active material at the electrode electrolyte interface and provided an easier manufacturing process for the components of the battery.

### ***Response to Arguments***

21. Applicant's arguments with respect to claims 9-13 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

22. Claim 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshino in view of Sonozaki and JP '868 as applied to claim 7 above, and further in view of either U.S. patent No. 5,244,757 (Takami) or U.S. patent No. 6,589,499 (Gao).

The difference not yet discussed is of the subordinate component element being Ti, Nb or Mg.

It is first noted that there is no criticality to this narrower range as opposed to that of Ti, Nb, Sn or Mg as recited in claim 8 and is held as an attempt to overcome the particular additive Sn as taught by Yoshino.

Use of numerous additive subordinate elements include Sn and Mg as taught by Takami (col. 3, ll. 1-22).

Art Unit: 1745

As defined above, the dopants A are used to replace the transition metal M and are not used to take the place of lithium ions in the lithium metal oxide, i.e.,  $\beta = 1 - \gamma$ . Therefore, the reversible capacity is maximized in the intercalation compounds of the invention. Exemplary dopants for use in the invention include metals and nonmetals such as Ti, Zr, Mg, Ca, Sr, Ba, Al, Ga, Si, Ge, Sn and combinations thereof. For example, A can include equal amounts of dopants  $Ti^{4+}$  and  $Mg^{2+}$ . Typically, in the compounds of the invention,  $\gamma$  is greater than or equal to 0 and less than about 0.5 (Gao, col. 4, ll. 27-38).

The motivation for using any of these elements is to raise the potential of the positive electrode and hence the voltage of the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Yoshino by using subordinate elements in the electrode such as Mg, Ti or Nb since they would have raised the potential of the positive electrode and hence the voltage of the battery. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

### ***Response to Arguments***

23. Applicant's arguments with respect to claims 16 have been considered but are moot in view of the new ground(s) of rejection.

**Conclusion**

24. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (571) 272-1283. The examiner can normally be reached on Monday to Thursday from 9 a.m. to 6 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. FAXES received after 4 p.m. will not be processed until the following business day. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published




Art Unit: 1745

applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gregg Cantelmo  
Primary Examiner  
Art Unit 1745

gc



April 1, 2004